eHealth Care Quality and Patient Safety Board
Financing Workgroup
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Status of EHR Adoption and Diffusion: Summary of Current Literature

- **Adoption rates of electronic health records are low among physician groups**
- **EHR Adoption Rate Directly Correlates to Size of Medical Group Practice**

The Medical Group Management Association (MGMA) study (3) of 3,300 medical group practices conducted in January-February 2005 found that 14.1 percent of all medical group practices use an EHR and 11.5 percent have an EHR fully implemented for all physicians and at all practice locations. Only 12.5 percent of medical group practices with five or fewer full-time-equivalent physicians (FTE) have adopted an EHR. The adoption rate increased with the size of practice: groups with 6 to 10 FTE physicians reported a 15.2 percent adoption rate; groups with 11-20 FTE physicians reported an 18.9 percent adoption rate; and groups of 20 or more FTE physicians had a 19.5 percent adoption rate. (The RAND corporation (5) , consistent with MGMA, reports that 15-20% of physician offices and 20-25% of hospitals had adopted EHRs.)

MGMA further reports that about 13 percent of groups were in the process of implementing an EHR, 14.2 percent said implementation is planned in the next year, and 19.8 percent said implementation was planned in 1 to 2 years. The remaining 41.8 percent have no immediate plans for EHR adoption. Among those with no immediate plans for implementation, the difference between large and small groups is striking—47.8 percent of practices with five or fewer FTE physicians compared with only 20.7 percent of practices with 21 or more physicians.

Burt and colleagues, using 2001-2003 data, reported slightly differing rates of adoption. They found that, among regions, Midwest physicians had the highest overall existing rate of EMR adoption, at 23.7%, with 20-25% reporting plans to invest in EMR in the next 12 months.

If plans carried out as reported, MGMA estimates that about 60% of practices, and 80% of the largest practices (21 or more physicians), would have adopted EHR technologies two years from Jan-Feb 2005. Still, nearly half of practices with 5 or fewer physicians reported no plans to implement EHR within the next two years.

<u>Range of Functionality (3)</u>

More than 97 percent of the respondents with an EHR reported that their system had functions for patient medications, prescriptions, patient demographic and visit/encounter notes. Less than 65 percent reported that their EHR provided drug formulary information or clinical guidelines and protocols. Eighty-three percent of respondents said their EHR was integrated with their practice billing system.

<u>Barriers to Adoption</u> (1, 2, 5, 6, 8, 11,13, 16, 17)
- Substantial initial costs and lack of capital resources to invest in EHR
- Practices are not convinced EHRs will improve their performance.
- Lack of good information about the return on investment in terms of cost and quality.
- Lack of certification and standardization.
- Privacy concerns.
- Disconnect between who pays for EMR and who profits.

State & RHIO Functionality, Start-Up and Operating Costs and Financing Strategy

State	Scope of Functionality	Start-Up/Infrastructure Funding	Sustainability/Maintenence Business Plan
Healthcare IT Transition Group "Funding RHIO Startup and Financing for Life," June 2006 (26) National Survey of 20,000 IT professionals, conducted in March-April 2006, reporting on 50 U.S. RHIOs	Phases: 48% in Start-up 22% in Transition 30% in Production	Start-up Phase: More than 70% of RHIO income, on average, from grants and other forms of contributed income.	Three revenue sources: "contributed income" (grants) Earned income, including membership and transaction fees. Loans Ongoing reliance on grants and/or other forms of contributed income as the organizations mature. While 68% said they either are or plan to be self-sufficient, more than 80% in each stage of development said that they anticipate applying for grants. Nearly 90% of the "self-supporting mature RHIOs said that they still anticipate applying for grants. Conclusion: * Expect that as much as 1/3 of total RHIO revenues will continue to come from government grants and philanthropy for the foreseeable future. * While this does not resemble a commercial enterprise or fee-based nonprofit healthcare provider, this business model is consistent with other non-profit organizations which supplement operational revenues with contributed funds. *RHIOs represent a public good and are

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			appropriately supported through public and private grants and in-kind contributions.
Arizona AHCCCS (Medicaid program)	CDR updated semi-weekly Web-based interface Medicaid-drive project Emphasis on mental health	$50K in hardware costs Funded entirely by State Medicaid program (AHCCCS). State staff support approx. $150K Considering costs of running internally vs. external vendor. Appears vendor solution 3-5X more than in-house.	
Arizona Health-e Connection Roadmap (18)	**Basic-Level Services:** Order/receive lab/radiology results Results viewing/printing Physician portal **Intermediate Level:** Basic services plus: ePrescribing (price based on number of formularies needed) Messaging/task management Drug-drug, drug-to-allergy alerts, etc. **Premium Level:** Basic/intermediate plus: Referrals Charge capture/right coding Decision support (alerts, best clinical practices, reminders,	Statewide Startup Cost Estimates: Central Coord Org: $3.0 - 4.0 M HIE: $1.5 - 3.0 M (2 years) HIT: 0 (Providers pay for their own IT)	Statewide Ongoing Costs/Year Central Coord Org: $3.0-5.0M*/year HIE: $2.5 - 4.0 M per 1 million population** HIT: $3000/clinician*** * = partially self funded (Patient Health Summary) ** = self funded (Results Delivery) *** assumes EMR-lite premium subscription Costs per Service Levels per Clinician Basic: $0 per month per physician Intermediate: $30 to $75 per month per clinician Premium: $100 to $250 per month per clinician

State	Scope of Functionality	Start-Up/Infrastructure Funding	Sustainability/Maintenence Business Plan
	facilitate diagnoses), Patient education		
Florida Health Information Network (23) (Statewide)	Connect ten existing local RHIOs; Central server, MPI, RLS, web services	State appropriation $1.5 million for FY 2006. Will support network infrastructure, and encourage local RHIO development, and give seed money to statewide HIT projects. Grants to support HIE interoperability. In addition, in 2004 the Florida Medicaid agency distributed 2000 hand-held PDAs to Medicaid physicians, increasing the number of physicians using the PDAs to 3000. Focused on potential to for medication management.	No ongoing revenue source or sustainable business model yet. Plan to seek additional $5 million recurring state appropriations, perhaps with private sector match provision. Considering membership dues with fees based on differentially accrued value to each stakeholder.
Hawaii Quality Healthcare Alliance HIE Network (Statewide)	CDR, EHR, eRx, eLab, UPIN, MPI, Patient Portal, Employer Portal, (Discounted single vendor solution)	Initial membership donations $15K per founding member = $80k and in-kind support Federal $500,000 AHRQ implementation grant Start-up also supported with grant funds from public and private organizations. K investment requirements will be distributed across stakeholders according to benefits accrued to each stakeholder category.	Subscription and data source fees Data sales for research Anticipated State and additional private sector funding Business model assumes that controlling resource consumption will generate savings in health premiums that can be reinvested in the HIE network. Major Sustainable Revenue Source: QHA HIE users will pay a subscribe fee, to represent a significant percentage of the HIE network's revenue. Four categories: 1)physicians and allied health professionals; 2) hospitals and LTC facilities; 3) patients; and 4) employers. The BOD will set the fees annually.

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			* Physicians will pay to access lab results and eRx. * Patients will pay to access health records and health education resources, creation of detailed individual health improvement plans, and ability to communicate via email with providers. * Employs will pay a fee for aggregate clinical data on their population and to participate in the wellness plan. * Payers will participate at no charge by providing baseline data on all patients, and benefit by reduced number of claims resulting from HIE. * Subscription income expected to increase as HIE services added. In 2007: Income will also be generated by selling de-identified clinical data from the CDH to research organizations, medical data warehouses, medical supply manufacturers, and pharmaceutical companies. Data sales charged per record transmitted, based on patient and provider written consent. Value of this service increases as data accrue. Seeking partnership agreement with State to develop a bioterrorism communication network, whereby QHA provides necessary infrastructure in exchange for HIE network usage fees by State DOH.

State	Scope of Functionality	Start-Up/Infrastructure Funding	Sustainability/Maintenence Business Plan
New York Telemedicine Demonstration Program	(Home health agency population only) Remote monitoring Interactive video technology CPOE EHR	$7 million State appropriation 2005-2006 Awards capped at $150,000 for two-year contracts to home care agencies with integrated telemedicine systems or those that wish to pursue, expand, upgrade, enhance, or modify their technologies.	No longer-term financing strategy yet. As a demonstration program, testing if Medicaid should ultimately reimburse for these services.
North Carolina Healthcare Information and Communications Alliance (NCHICA) healthcare Quality Initiative (HQI) (statewide)	Phase 1: Point-of-care medication management, automated refill, formulary and benefits information, and eRx Phase II: Electronic lab and radiology results ordering and results at point of care. Phase III: EHR	$1.5 million Federal NHIN prototype award Membership fees and in-kind support Private Sector – Industry/Large Employers Broad based of stakeholder buy-in, with many large employers. Clinicians see potential to reduce the length of patient encounter by 10-40% (according to (NCHICA analysis), improve patient safety, and automate medication refills. Employers, payers, and pharmacies see HIT as opportunity for cost savings from increased use of generics, fewer outbound calls to physicians, and automated prescription refills. Also see as a way to understand technology trends and product development needs.	Not yet sure how much external funding will be needed and how the project will be sustained. But strong relationship and collaboration with Medicaid program. Also, NCHICA has 10 year history with HIT, including immunization project, ED data collection and standards for surveillance.
Rhode Island Quality Institute HIE (statewide)	MPI EHR Exchange outpatient lab data and medication history (single EHR vendor)	Federal AHRQ - $5 million over 5 years – primary source of funding Private sector foundations $296,000 Stakeholder contributions - $50,000	Not yet identified a model that will support long-term fiscal sustainability of HIE Initiative. Plan to develop a model in which organizations pay based on the benefit they would receive. Sustainability Committee chaired by RI Health

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			Insurance Commissioner.
Memphis TN MidSouth eHealth Alliance (1million TN residents in 3 counties and 100K residents in adjacent states)	CDR Regional MPI Real-time data across hospital Eds	Federal AHRQ $5 million over 5 years State appropriations - $8.7 million Vanderbilt University $750,000 in-kind (technology, staff, space, supplies)	No current ongoing revenue source or sustainable business model. "no comprehensive sustainable financial model that would not be fundamentally threatening to some participants." Expects project to benefit from P4P, pay-for-use, or other quality programs. Project plans to demonstrate savings to Medicaid and other delivery systems before defining a financial model.
Utah Health Information Network (statewide and bordering states) (24)	<u>Phase I</u>: Central hub (UHIN gateway) using secure web services infrastructure <u>Phase II</u>: Exchange of standardized direct messages (where submitter knows who the receiver is), to include medication management, formulary and benefit insurance information, eRx, and Health Level 7 (www.HL7.org) transactions) Pilot Project: exchange of de-identified chief complaint data, when patient admitted to the ED, under State's biosurveillance and public health efforts to track outbreaks and monitor disease. <u>Phase III</u>: Considering use of MPI	Federal AHRQ $5 million over 5 years State $660,000 over 2 years UHIN, founded in 1993, owned by members , including a broad-based coalition of physicians, provider institutions, payers, employers, and State government. Immediate and long-term business case in standardizing claims and claims-related (e.g., eligibility, remittance advice, reports) health care information to be exchanged through a single portal (UHIN gateway).	UHIN only provides services that have business value for its members and for which member will pay. Its self-supporting business model includes membership fees for providers. Per-claim transaction fees for payers. Claims-related transactions are included in the claim transaction fee. In 1999, UHIN expanded beyond claims to support the electronic exchange of clinical information. UHIN is a recognized SDO (Standards Development Organization)

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	(UHIN well-established 10 year history, and already successful history in exchanging claims-based health care data)		
Massachusetts MA-SHARE	The MA-SHARE operating model is generally conceived as that of a facilitator and incubator, in which projects exploring healthcare data connectivity will be undertaken in order to develop, pilot and demonstrate new healthcare information technologies across communities and enterprises.	MA-SHARE is a program of the Massachusetts Health Data Consortium. MA-SHARE began formal operations in May, 2003. Over 2 years, MA-SHARE has raised $1.1 Million for its projects -- with the financial support of cornerstone grants from Blue Cross and Blue Shield of Massachusetts and additional support from Partners Healthcare System, Harvard Pilgrim Health Care, Tufts Health Plan, Fallon Health Plan, Neighborhood Health Plan and the MA Medical Society.	
Massachusetts eHealth Collaborative (MaeHC) (statewide)	HER 3 pilot communities to begin clinical IT systems and data exchange capabilities.	MaeHC is a non-profit entity representing 34 of MA's key health care stakeholders. BC/BS pledged up to $50 million for EHR	Pilot communities will develop operational and financing models to facilitate statewide adoption.
Santa Barbara County Care Data Exchange (CDE - regional) (29)	RHIO for care management, clinical analysis Peer-to-peer HIE with a central, "smart index" and a federated data model to access clinical results from multiple data providers and IT systems within	$10 million CHCF in 1999 Each constituent bears some costs for implementing and operating data sharing. These costs include all of the internal costs for data integration and implementing data sharing as well as an allocated share of the central infrastructure costs. Central costs	$450 million 3-year eHI HRSA grant "overall magnitude of returns is relatively low." As a medium sized, high-penetration scenario, the net financial benefit is more than $1 million, which does not take into account any financial benefits from clinical efficiency

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	participating healthcare organizations. Provides secure data access without using a central data repository. Authorized users within the network can access a "patient-centric" view of clinical and administrative results, including patient demographics, laboratory, pharmacy data, radiology, medical records and transcription, eligibility and referral information.	are allocated to constituents other than physicians on the basis of the number of unique lives for which data are made available to them. Physicians are allocated a small training fee. Physicians are essentially free riders in the SBCCDE, but this is the result of a business choice. If physician paid up to their $2,400 marginal benefit, this would itself double the ROI for the community in addition to the other financial and non-financial benefits.	changes, more any service or quality benefits. However, a “net benefit of $1 million is a small fraction of health care expenditures in Santa Barbara or any other region… The ability of the SBCCDE to be net positive at all results from the ultra-low cost of deployment and operation of the SBCCDE, resulting from the use of peer-to-peer technology, which scales the benefits to the cost of operation and carries little overhead.”
Delaware Health Information Network	A distributed model for data-sharing will include lab, radiology, prescription, diagnosis, procedure and allergy information. That is, the data will reside within the organization at which the data originated. DHIN will not develop a database or data repository for the purpose of the Utility. Additional components to the Utility likely will include a patient portal, a disease management/decision support module, audit trail and billing functions, claims retrieval and	The utility, when developed, will be a computerized network by which a patient can consent to have hospitals, labs, diagnostic facilities (e.g.., x-ray facilities) and insurers make their clinical information available, to the patient's health care providers at the time and place they are getting care, any time of the day or week. The information will be sent in a "near real time" environment.	Under purview of Delaware Health Care Commission. A public/private partnership that provides the organization infrastructure to support a clinical information sharing “utility.”

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	processing, and secured messaging/email to facilitate improved provider-to-provider and patient-to-provider communication.		
Rhode Island Quality Institute (RIQI) (28)	Group Purchasing Financing Strategy beyond grants, tax credits, and P4P	Group Purchasing puts EHRs in small offices: Physicians find strength in numbers when negotiating with technology vendors. ACP Observer, March 2006, American College of Physicians. Groups separate and compete clinically, but create a group for EHR purchasing. Single EHR system for all the groups' affiliated physicians – Negotiating with vendors on behalf of 1,200 physicians. Engineer a volume discount through a group purchasing plan – overcome the cost barrier. Subsidies from major stakeholders: In order to get the discount they were seeking, the group leveraged subsidies from potential beneficiaries of physicians' use of HIT, such as worker's compensation insurers, medical liability carriers, large self-insured employers and state health plans. Contributions from those stakeholders allow group to sell product from 15%-30% discount.	Get EHR at prices up to 30% off what they might have expected to pay. Electronic Health Records of Rhode Island (EHRRI), a for-profit corporation formed by five different physician organizations. Advantages: gaining critical mass, centralized system support, internal help desk , template building staff. Improved workflow and overhead. Reduced costs of non-clinical personnel and support staff from 38% of revenue to 28% of revenue

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Regional New York, CT (28) and Middlesex County, CT (28)	Web-Based Information Portals May include patient registry, lab interface, means of communicating lab and imaging result among providers. “Continuity of care record” – a standard EHR shared and updated by all treating physicians.	NY: Web-based portals facilitate information sharing and price leverage New York, 500 doctors established a web-based central database. CT: 1/3 to ¼ the average per-physician cost for an EHR start-up.	NY: For a monthly subscription fee of between \$500-\$600, doctors can log onto a secure Web site to check lab and imaging results and send prescriptions electronically to participating pharmacies. Also introducing comprehensive, interoperable online EHR.
Kingsport, TN CareSpark, Regional - 750 physicians		Business plan calls for \$15 million investment to generate a \$48 million return foundations, employers and government health care purchasers	Monthly physician fee <\$400/month physicians get incentive payments for using EHR and eRx. Ultimately, RHIO costs get buried in health insurance premiums: \$0.05-\$0.10/pmpm.

ROI for HIT/HIE: Challenges and Observations

- Promises to improved clinical processes and work flow.
- Former DHHS Secretary Thompson, upon launching the "Decade of HIT" told Health Affairs' John Iglehart that adoption of HIT could reduce medical spending by 15-23%.
- Provider adoption is challenged by high up-front and maintenance costs, weak evidence of ROI, and misalignment of incentives in reimbursement system, and perception that patients and payers reap rewards that providers pay for. (1,2,5,6,8,11,13, 16, 17)

AHRQ researchers (1) interviewed officials from eight State projects, all of whom identified the following factors as critical to initial planning and early implementation stages: State's role as a catalyst (including leadership support); Broad stakeholder inclusion (including early engagement of physicians and physician champions); Clear value proposition with early "wins"; Technological Interoperability.

Scope of Functionality:
The technologies and initiatives most commonly sited across projects are

- EHR
- RIOS to support HIE
- Electronic prescribing (eRx) and medication management.

Most projects have embraced technology, with considerable variation. These include EHR, clinical data repository (CDR), master patient index (MPI), record locator services (RLS), telemedicine technology, eRx, technologies to support medication management, and disease or immunization registries. There appears to be a high priority placed on CDRs by State-driven projects, perhaps to support their biosurveillance and public health tracking needs. RHIOs many and varied, with minimal inter-RHIO coordination.

Funding
Information on financing varies significantly and is often unavailable. Finance details are limited. Some level of funding information (either funding sources or award amount) was available, with project funding levels ranging from $200,000 to $1 billion over 4 years. However, in most cases, details about the projects' funding and financing strategies are inconsistent, incomplete, and often unavailable. It is also clear that most funding comes from Federal and State governments, followed by foundation grants and private sector financing.

Funding of individual projects range form $50k to $14.5M including in-kind support. In terms of State HIE funding across projects in a single State, New York was an outlier with $1B in capital funds to promote improvements to the State's health care system. Most State and HIE projects rely on a mix of funding streams (e.g., Federal, State, foundation, in-kind) but all are seeking initial funds and models for sustainable funding. Regardless of State, start-up funding and the quest for long-term sustainable revenue represent two of most significant challenge facing HIE projects today.

Clear Value Proposition with Early "Wins"
Many project leaders indicated their commitment to identifying the "value proposition" for all involved stakeholders and saw this as essential to enabling successful implementation. Many stressed that the importance of finding opportunities for quick successes and that demonstrating short-term wins cannot be overstated.
"Try to find an easy first (project) that showcases the ROI or real benefit, easily and quickly."

Long-term Sustainability and Financing

While many of the interviewees discussed their project's progress and success within the planning stages or in moving from planning to implementation, the majority of interviewees could not articulate their project's long-term sustainability or tested revenue models. The exceptions were UHIN and NCHICA which were able to discuss their value proposition and sustainable organizational models for their previous activities to date. Utah UHIN's financing model for administrative transactions may be the closest to the sustainable framework.

Long-term sustainability and financing appear to be the most challenging and, in most cases, unknown aspects of these initiatives. Some initiatives are discussing a variety of alternatives; many are looking to other programs for models and insights, while for some, financing and sustainability remains a notable obstacle. For established HIE initiatives considering specific strategies, the most common strategy appears to be a data fee model where subscribers pay a fee to access the data and participate in the HIE. This fee is proportionate to the benefit subscribers will receive from the project. For example, employers and payers frequently reap a greater benefit than providers, and therefore would pay a higher fee. The fees, how they are calculated and collected, and when they begin, vary across projects but in all cases are not yet in effect. In some instances, fees are expected to be collected beginning later in 2006. Questions about how much, if any, consumers will pay for access to EHRs or PHRs also loom as untested territory.

Many of the initiatives do not have fee structures or revenue models in place, yet the interviewees stressed that once they understand how HIE will benefit the varied stakeholders and individual organizations they will be able to better understand how fiscal responsibility can be equitably shared. Ultimately, HIE projects need to demonstrate that HIE will improve care for patients, make the processes easier, more efficient, and more effective for stakeholders, particularly physicians.

"There is great competition for healthcare funding. Given that 100% of health dollars are consumed somewhere, it is unreasonable to think that those who get the dollars will easily give them up if they are not somehow part of a 'sustained' initiative, even if such a relationship is less than optimally efficient to the community."

An April 2006 AHRQ report (11) concluded the following:

> "Using existing published evidence, it is not possible to draw firm conclusions about which HIT functionalities are most likely to achieve certain health benefits – and the assessment of costs is even more uncertain.
>
> "Existing evidence is not sufficient to clearly define "who pays for" and "who benefits from" HIT implementation in any health care organization – except those, such as Kaiser and the VA, that are responsible for paying for and delivering all the care for the defined population."

EHR Adoption, ROI, Costs/Benefits, Investments and Incentives for Promoting HIT/HIE

Source	**Initial Cost Estimate/Strategy**	**Maintenence Cost**	**ROI**
Jan Walker, et al. Center for Information Technology Leadership: *The Value of Healthcare Information Exchange and Interoperability*. Health Affairs, January 2005. (9)	Cost: ($280 billion) $28 billion per year during a ten-year deployment, Level 3 HIE Offices 162.9 B Hospitals 27.1 B Office-Hospital Interface 123.9 B Stakeholder Interface 6.4 B Total $320 B Level 4 HIE Offices $162.9 B Hospitals 27.1 B O-H Interface 75.7 B Stakeholder Interface 9.9 B Total $276 B Patient Safety Institute: Initial cost of widespread connectivity of EMR systems (not of the EMR system itself) $2.5 billion.	$16 billion per year thereafter. Level 3 9.1 B 1.6 B 9.0 B 0.5 B $ 20.2 B Level 4 9.1 B 1.6B 5.4 B 0.5 B $ 16.5 B	National net savings: $21.6-$77.8 billion per year, depending on the level of standardization of broadly adopted, interoperable EMR system. State of CO projects $225M savings. Level 4 net value distribution Providers: $33.7 B (43%) Payers $27.6 B (35%) Laboratories: $13.1 B (16%) Radiology centers: $8.2B (10%) Pharmacies: $1.3 B (1%) Public Health Depts: $94 million (1%) Annual Benefit of Level 4 HIEI US / mid-size hospital (50-199 beds) Prov-Lab $31.8 b (U.S.) $200,000 Prov-Rad $26.0 b (U.S.) $170,000 Prov-Payer $20.1 b (U.S. $250,000 Prov-Prov $13.2 b $570,000 Prov-Pharm $ 2.7 b $ 70,000 Prov- PH $195 m -
Meta-analysis: RAND: Extrapolating Evidence of HIT Savings and Costs. 2005. (6)	Acquisition costs: Hospital: 1.8%-3% of yearly operating expenditures for an average period of four years.		Efficiency savings – ability to perform the same task with fewer resources (money, time, personnel).

Source	Initial Cost Estimate/Strategy	Maintenence Cost	ROI
RAND Research Highlights 2005. (12)	Physician office: $22,000 per physician National cumulative costs over 15 years: Hospital $97.4B, or $6.5B/year Ambulatory: $17.2B or $1.1B/year Total: $114.6B, or $7.6B/year		Potential efficiency savings $80B if HIT adoption 100% overnight. Mean yearly savings of about $40B over 15 years. Savings distribution: Inpatient: 75% (reduced LOS, increased nurse productivity) Other typical reductions in expenditures are 10-15%. Aggregate all health care sectors: mean annual savings almost $42B, with mean annual costs $7.6B. Conclusion: Overall savings are large compared with costs. Annual savings from efficiency alone could reach more than $77B. Health and safety benefits could double the savings while reducing illness and prolonging life.
Markle Foundation, 2004: Achieving Electronic Connectivity in Health Care. (16) JHIM 2004 reported that in 2001, ambulatory care practices had lowers adoption rates of health care IT among the provider sector, with 6-13%.	Assuming fully functioning EHR K and on-going costs amortized over at least a 30 year period cost a physician approximately $12-15K per year, an incentive of $3-$6 per patient visit of $0.50-$1.00 PMPM would result in $12K-$24K per year per physician.	Estimate range accounts for variability in implementation costs and practice size with the higher end of the range reflecting significant	Importance of selecting incremental clinical applications that deliver high value quickly: Medication management and chronic care management Analyses show that e-Rx (e-prescribing and on-line tools for chronic disease management may be good starting points for building an information sharing

Source	Initial Cost Estimate/Strategy	Maintenence Cost	ROI
Financial and support mechanisms necessary to significantly increase EHF adoption by the small to medium sized practice: "Extensive regional and national interoperability will not be possible unless there is extensive EHR adoption in this critical segment of the industry." "Typical" outpatient physician practice of five physicians in a primary care practice and a cardiology specialty practice. EHR, eRx and on-line chronic care management tool adoption in the ambulatory care setting. Analyzed a comprehensive list of costs of adoption as well as benefits realized by the physician practice over a three-year period to account for K costs and improved efficiencies.	Estimate represents approximately $7 billion-$15 billion per year for 3 years or 1.2$ to 2.4% of total amount spend on ambulatory care in 2003 on an annual basis.	implementation and support costs, an offset for revenue loss related to practice productivity loss, and/or failure to have incentives in place from all payers.	pathway toward wide-scale EHR adoption....applications such as disease registries and cross-organization information access may also provide strong starting points toward EHR adoption. To improve the business case for providers, realign incentives: In addition to federal government financial and non-financial policy actions, both health plans and self-0insured employers must play a significant market intervention role to accelerate provider adoption by participating in complementary incentive strategies. (Bridges to Excellence concluded that "meaningful" incentives was achieved when a bonus was equivalent to 5% - 10% of a physicians income, which translates into $10K-$20K.)
Miller, et al. "The Value of EHR in Solo or Small Group Practices," Health Affairs, September/October 2005. (7)	Initial EHR costs averaged $44K per FTE provider (range $37,056-$63,600 per FTE provider) Variation reflects heterogeneity among small practices in pre-EHR hardware and in technical and negotiating skills	Ongoing costs averaged $8,500 per provider per year, or 19.5% of initial costs Revenue losses from reduced visits	The average practice paid for its EHR costs in 2.5 years and gained more than $23K in net benefits per FTE provider per year following. * Financial benefits averaged $33K per FTE provider per year.

Source	Initial Cost Estimate/Strategy	Maintenence Cost	ROI
"Physicians EHR adoption is slowed by a reimbursement system that rewards the volume of services more than it does their quality." .	Software , training, and installation costs averaged $22,038 per FTE provider. Software alone 1/3 of overall costs. Installation and training costs range from virtually non to more than $14K per FTE provider Hardware costs per provider averaged almost $13,000 per FTE provider (range$7,500-$23,000)	during training and implementation averaged $7,473 per FTE providers (range non to $20,000 per FTE provider). <u>Annual costs</u> Software maint and support $2,500 Hardware replace $3,200 IS staff/contracts $2,000	* Increased coding levels ($16,929, range $3,040-$41,711) * Efficiency related savings or revenue gains (48.3% of benefits, or $15,808 per FTE provider. * Efficiency related gains (40.1% of benefits) mostly from decreased personnel costs * Efficiency related gains from increased patient visits accounted for 8.1% of financial benefits * All practices had some savings ranging form $1,000 to $42,500 per FTE provider per year
Gans et al, Medical Groups' Adoption of EHR and IT. *Health Affairs*, September 2005. (3) Based on MGMA survey in Jan-Feb 2005: 15% of all practices reported EHRs. Varies greatly by practice size, somewhat by specialty type and ownership, minimally by region. 5 of fewer FTE physicians: 12% more than 10 physicians: 19% 21 or greater: 20%	EHRs average initial costs approximately $33K per physician (higher in small practices and lower in larger practices). Highest implementation cost per physician at $37,204. Most practices do not have retained earnings. K expenditures are funded directly from physician income. Cost overruns average 25% over vendors' estimates.	Maintenance costs about $1,500 per physician per month. Added to monthly maintenance costs, the initial costs, even if amortized over five years at 8% interest, translate into about a 10% reduction in annual take-home pay.	Other computer - based systems – billing and patient scheduling – not costly to install and provide immediate efficiency gains

Source	Initial Cost Estimate/Strategy	Maintenence Cost	ROI
		Reduction in practices productivity of 10-15% for at least several months	
Hillestad, et al. Health Affairs, 2005 (4) EMR implementation and networking could save more than $81 billion annually HIT-enabled prevention and management of chronic disease could double those savings. Barriers: Acquisition and implementation costs Slow and uncertain financial payoffs, Disruptive effects on practices Providers absorb the costs, but consumers and payers reap the savings.	<u>Adoption costs for hospitals:</u> Cumulative cost for 90% of hospitals to adopt an EMR system is $98 billion if 20% of hospitals now have such as system. <u>Adoption costs for physicians:</u> Cumulative costs to reach 90% adoption are $17.2 billion, equally split between one-time costs and maintenance costs Costs of Adoption: Estimates included a productivity loss of 15% for 3 months, $3,000 per physician for additional hardware costs.	Yearly maintenance costs equal to 20% of the one-time costs. <u>Hospitals</u>: Average yearly costs for 15-year adoption period $6.5 billion (1/5 of potential efficiency savings in hospitals) <u>Physicians</u>: Average yearly cost during the adoption period is about $1.1 billion Total $7.6 B/year over 15 years for EMR adoption	At a 90% adoption, potential HIT-enabled efficiency savings for both inpatient and outpatient care could average more than $77 billion per year (an average annual savings of $42 billion during the adoption period). Largest savings come from reducing hospital LOS, nurses' admin time, drug usage in hospitals, and drug and radiology usage in outpatient setting. Medicare $23 billion potential savings per year; Private payers $31 billion potential per year Potential average annual efficiency and safety benefits from ambulatory EMR systems $11 billion <u>Potential Net savings from EMR System</u>: Over 15 years, cumulative potential net efficiency and safety savings from hospital systems $371 billion; physician practice EMR $142 billion. - Potential net financial benefit could double if include health savings by chronic disease prevention management.

Source	Initial Cost Estimate/Strategy	Maintenence Cost	ROI
Goodman response: “Savings in EMR Systems? Do It for the Quality.” “It is unrealistic to hold out widespread adoption of HIT as a net cost saver.” (8) Savings have not been discounted and do not account for inflation in health spending		Annual maintenance costs 20% (outpatient)-30% (inpatient setting) of implementation costs	Fifteen years out: $82 billion, with $513 billion accrued over time in savings. “But the case for investing now in widespread adoption of EMR systems based on efficiency and safety savings that would eventually rise to an annual 1.6% clip and that would chip away 1.05% from aggregate health spending by 2019 does not look dramatic from here.
Santa Barbara County Care Data Exchange (29) Interim Report, July 2003	Returns by Size of Penetration: <u>Medium Region, High Penetration</u>: Costs : 1.4 M Benefits: $2.6 M Net: $1.2 M <u>Large Region with High Penetration</u> <u>Annual Total Costs By Constituent</u>: Hospitals: $840K Imaging Center: $440K Laboratory: $220K Physician Groups: $360K <u>Solo Physician: $70 K</u> Total Costs: $2.2 M		“overall magnitude of returns is relatively low.” Net benefit does not take into account any financial benefits from clinical efficiency changes, more any service or quality benefits. <u>Large Region with High Penetration</u> <u>Annual Net Benefit by Constituent</u>: Hospitals: $1.16M Imaging Center: <320K> Laboratory: $260K Physician Groups: $0.74M <u>Solo Physician: $3.43M</u> Total Benefits: $5.2M

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